

Amendment and Response

Applicant: Gerald Deboy

Serial No.: 10/790,979

Filed: March 2, 2004

Docket No.: I434.103.101/IFT975US

Title: SEMICONDUCTOR COMPONENT WITH INCREASED DIELECTRIC STRENGTH AND/OR REDUCED ON RESISTANCE

IN THE CLAIMS

Please cancel claim 22.

Please add claim 25.

Please amend claim 23 as follows:

1. (Original) A semiconductor component comprising:
 - a first semiconductor zone of a first conduction type;
 - a second semiconductor zone of a second conduction type;
 - a drift zone arranged between the first semiconductor zone and the second semiconductor zone, wherein the drift zone has at least one third semiconductor zone of the second conduction type extending between the first semiconductor zone and the second semiconductor zone and at least one fourth semiconductor zone of the first conduction type adjoining the third semiconductor zone;
 - wherein the third zone enables a current flow between the first semiconductor zone and the second semiconductor zone in a current flow direction, and charge carriers of the third and fourth semiconductor zone at least partially compensate for one another in the event of a reverse-biased junction between the first semiconductor zone and the third semiconductor zone; and
 - wherein a degree of compensation is determined in individual regions of the drift zone by the difference between the number of dopant atoms of the first conduction type and the number of dopant atoms of the second conduction type relative to the number of dopant atoms of the second conduction type, wherein each of said individual regions in a direction perpendicular to pn-junctions between adjacent third and fourth semiconductor zones at least includes a portion of one third zone and a portion of one adjacent fourth zone, and wherein the degree of compensation varies at least in a section of the drift zone in a direction perpendicular to the current flow direction.

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2. (Original) The semiconductor component of claim 1, wherein a fifth semiconductor zone of the second conduction type is arranged in the first semiconductor zone at a distance from the drift zone, and is contact-connected by a connection electrode, and wherein a control electrode is arranged adjacent to the first semiconductor zone in a manner insulated from the semiconductor zones.
3. (Original) The semiconductor component of claim 1, wherein the drift zone has a lateral edge area running parallel to the current flow direction.
4. (Original) The semiconductor component of claim 3, wherein the degree of compensation increases proceeding from the edge area at least in a section of the drift zone perpendicular to the current flow direction.
5. (Original) The semiconductor component of claim 4, wherein the drift zone has a plurality of third and fourth semiconductor zones that are arranged alternately and extend in layer-like fashion in the current flow direction.
6. (Original) The semiconductor component of claim 5, wherein the fourth semiconductor zones are in each case doped to an identical extent with dopant atoms of the first conduction type, and wherein the doping concentration of the third semiconductor zones decreases in the direction of the edge area.
7. (Original) The semiconductor component of claim 6, wherein the third semiconductor zones inherently have an at least approximately constant doping.
8. (Original) The semiconductor component of claim 7, wherein the third zones are in each case doped to an identical extent with dopant atoms of the second conduction type, and wherein the doping of the fourth semiconductor zones increases in the direction of the edge area.

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9. (Original) The semiconductor component of claim 8, wherein the fourth semiconductor zones inherently have an at least approximately constant doping.
10. (Original) The semiconductor component of claim 5, wherein the doping of the third semiconductor zones with dopant atoms of the second conduction type decreases in the direction of the edge, and wherein the doping of the fourth semiconductor zones with dopant atoms of the first conduction type increases in the direction of the edge.
11. (Withdrawn) The semiconductor component of claim 4, wherein the drift zone has a third semiconductor zone extending from the first semiconductor zone as far as the second semiconductor zone, and wherein a plurality of fourth semiconductor zones formed in pillar-type fashion are arranged in the drift zone and, in terms of their longitudinal direction, extend perpendicular to the current flow direction.
12. (Withdrawn) The semiconductor component of claim 11, wherein the doping of the third semiconductor zone with dopant atoms of the second conduction type is identical at least approximately at all points, and wherein the doping of the pillar-type fourth semiconductor zone varies in the longitudinal direction thereof.
13. (Withdrawn) The semiconductor component of claim 11, wherein the doping of the third semiconductor zone with dopant atoms of the second conduction type varies in a direction perpendicular to the current flow direction, and wherein the doping of the pillar-type fourth semiconductor zone is identical at least approximately at all points in its longitudinal direction.
14. (Withdrawn) The semiconductor component of claim 4, wherein the drift zone comprises a plurality of semiconductor layers arranged one above the other, the third and fourth semiconductor zones, which are elongated in the current flow direction, are arranged alternately

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next to one another in each semiconductor layer, the third semiconductor zones of the individual layers are arranged one above the other, and wherein the fourth semiconductor zones of the individual layers are arranged one above the other.

15. (Withdrawn) The semiconductor component of claim 14, wherein the doping of the third semiconductor zones with dopant atoms of the second conduction type is identical at least approximately at all points, while the doping of the fourth semiconductor zones varies in a direction perpendicular to the current flow direction.

16. (Withdrawn) The semiconductor component of claim 14, wherein the doping of the fourth semiconductor zones with dopant atoms of the first conduction type is identical at least approximately at all points, while the doping of the third semiconductor zones varies in a direction perpendicular to the current flow direction.

17. (Withdrawn) The semiconductor component of claim 16, wherein the degree of compensation varies in the drift zone in the current flow direction.

18. (Withdrawn) The semiconductor component of claim 17, wherein the degree of compensation increases in the drift zone proceeding from the first semiconductor zone in the direction of the second semiconductor zone.

19. (Withdrawn) The semiconductor component of claim 18, wherein the third semiconductor zones and the fourth semiconductor zones run approximately in wedge-shaped fashion in plan view in the current flow direction.

20. (Withdrawn) The semiconductor component of claim 19, wherein the fourth semiconductor zones taper proceeding from the first semiconductor zone in the direction of the second semiconductor zone, while the third semiconductor zones widen correspondingly.

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21. (Withdrawn) The semiconductor component of claim 20, wherein the doping in the individual third semiconductor zones and the individual fourth semiconductor zones is at least approximately homogeneous.

22. (Cancelled)

23. (Currently Amended) ~~The semiconductor component of claim 22;~~ A semiconductor component comprising:

a first semiconductor zone of a first conduction type;

a second semiconductor zone of a second conduction type;

a drift zone of the second conduction type arranged between the first semiconductor zone and the second semiconductor zone, wherein the drift zone enables a current flow from the first semiconductor zone to the second semiconductor zone in a current flow direction;

wherein at least in a section of the drift zone, the doping concentration of dopant atoms of the second conduction type varies in a direction perpendicular to the current flow direction; and

wherein the doping of the at least one section increases, proceeding from an edge region of the section through which current flows, said edge region running in the current flow direction, perpendicular to the current flow direction.

24. (Original) The semiconductor component of claim 23, wherein the current flow direction runs parallel to a front side of a semiconductor body, wherein the first semiconductor zone, the second semiconductor zone and the drift zone are formed, and wherein the doping of the drift zone with dopant atoms of the second conduction type increases, proceeding from the front side, perpendicular to the current flow direction.

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25. (New) The semiconductor component of claims 23, wherein the current flow direction runs perpendicular to a front side of a semiconductor body in which the first semiconductor zone, the second semiconductor zone and the drift zone are formed.